PATENT & TRADEMARK OFFICE
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FIG.1

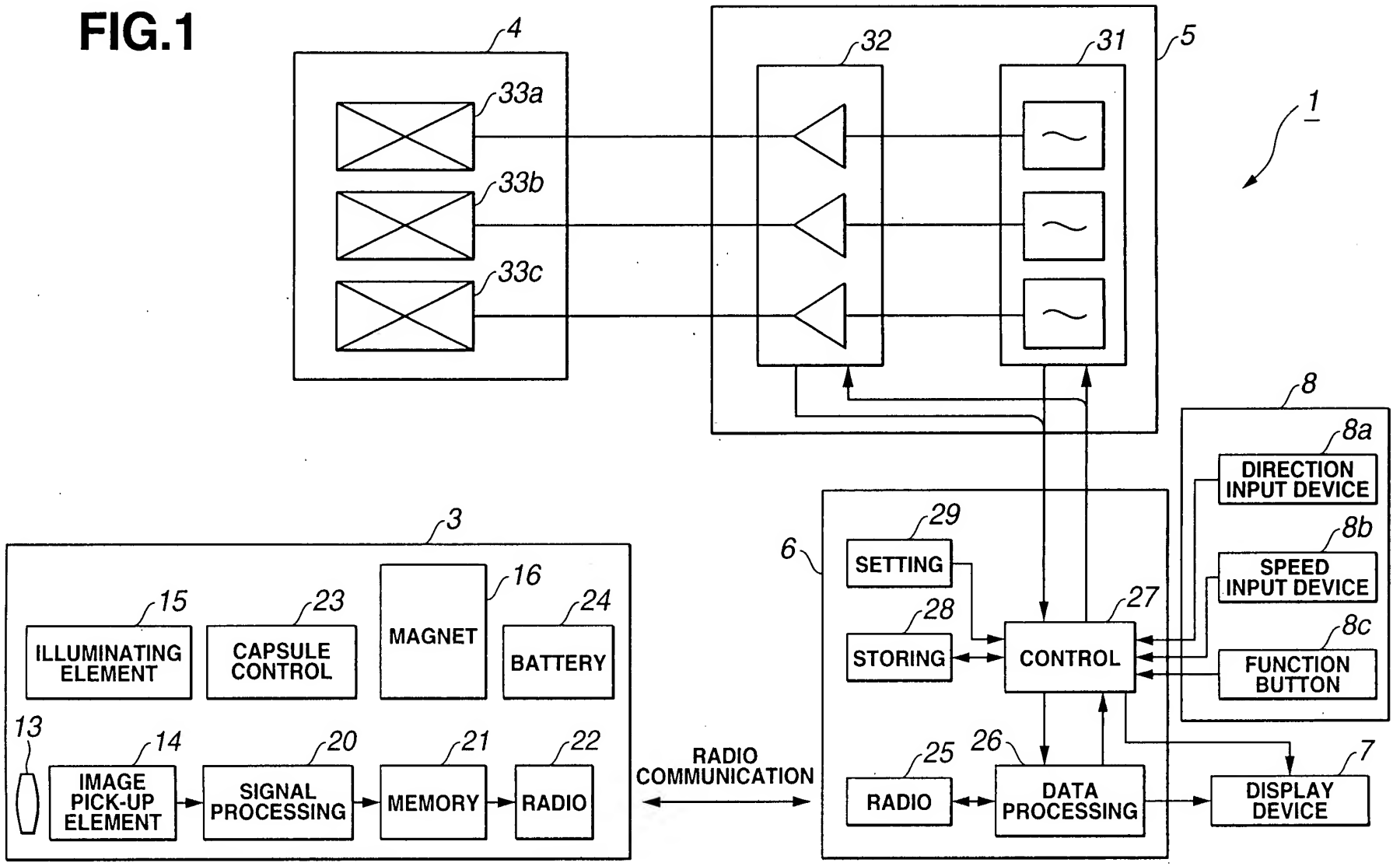

FIG.2

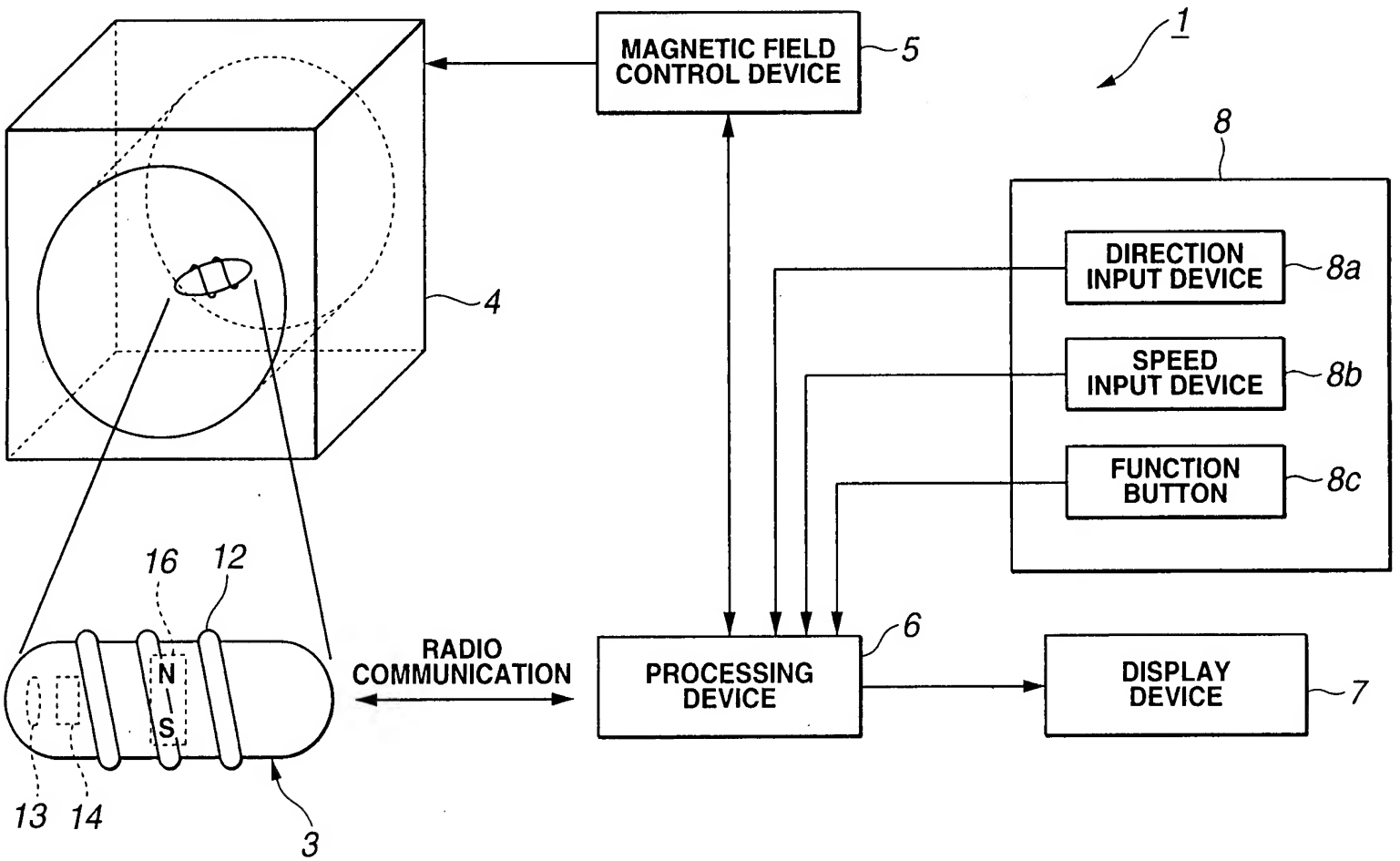
MAGNETIC FIELD CONTROL DEVICE
5
1
8
DIRECTION INPUT DEVICE
8a
SPEED INPUT DEVICE
8b
FUNCTION BUTTON
8c
4
16
12
N
S
13
14
3
RADIO COMMUNICATION
PROCESSING DEVICE
6
DISPLAY DEVICE
7

FIG.3B

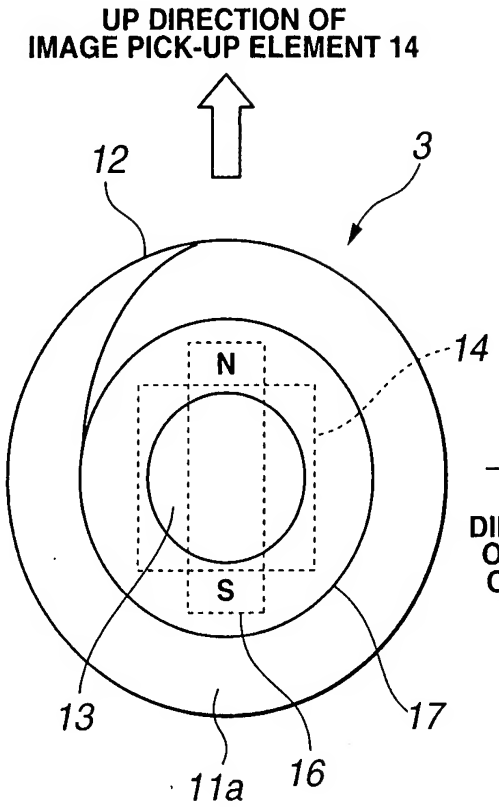
UP DIRECTION OF
IMAGE PICK-UP ELEMENT 14
12
3
14
N
S
13
17
11a
16

FIG.3A

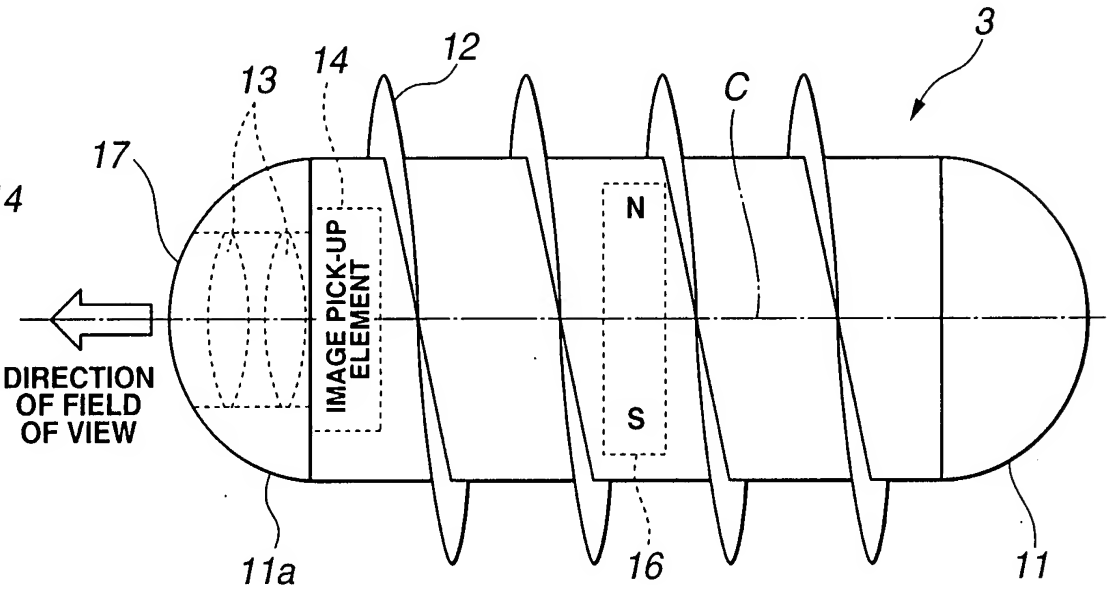
13
14
12
C
3
17
N
S
IMAGE PICK-UP ELEMENT
DIRECTION OF FIELD OF VIEW
11a
16
11

FIG.4A

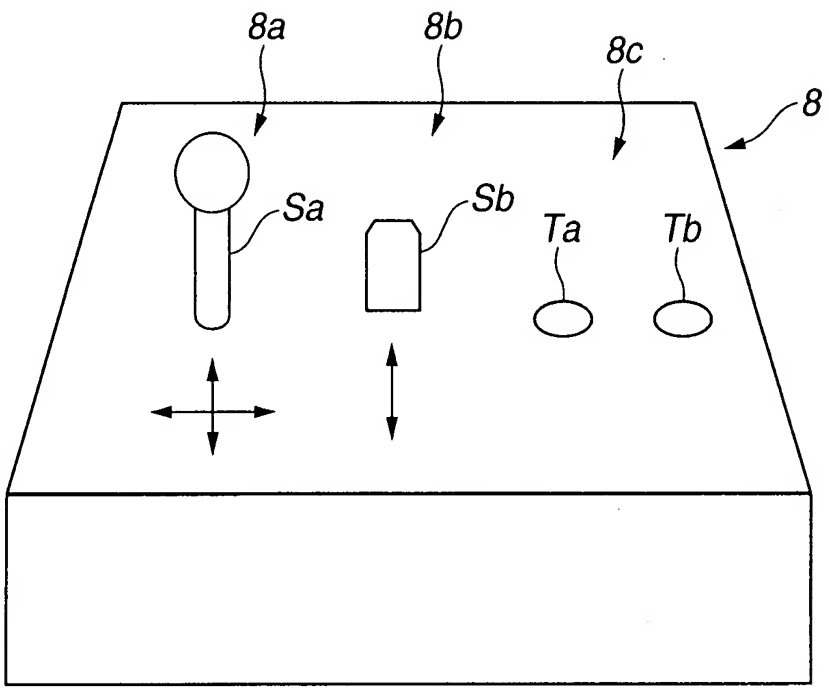

FIG.4B

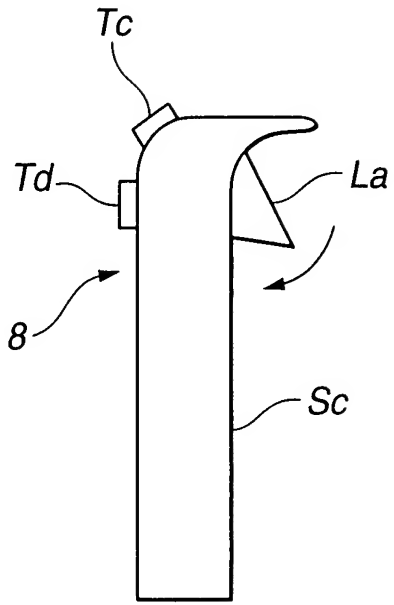

FIG.4C

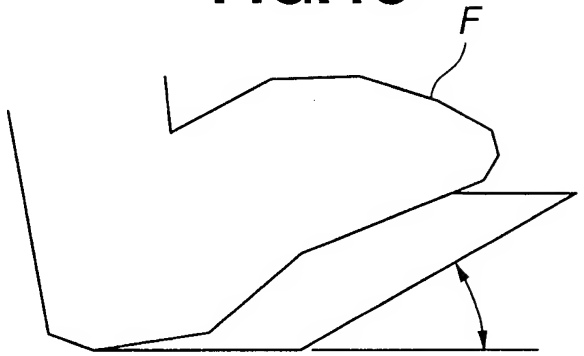

FIG.5A

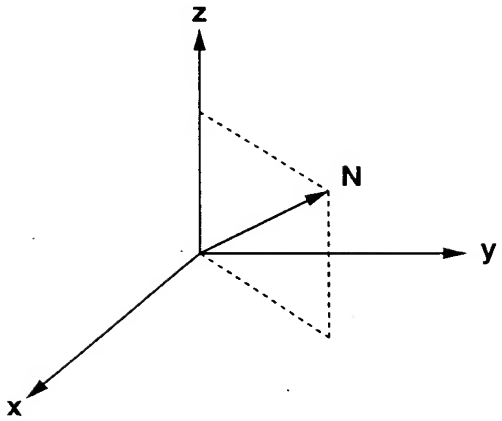

FIG.5B

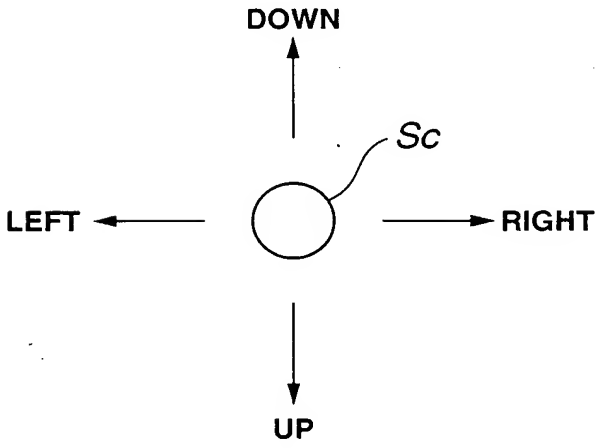

FIG.5C

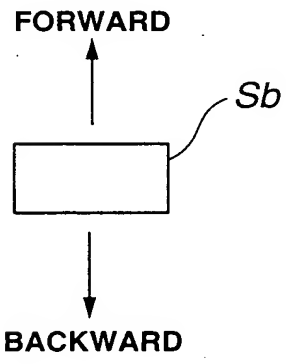

FIG.6B

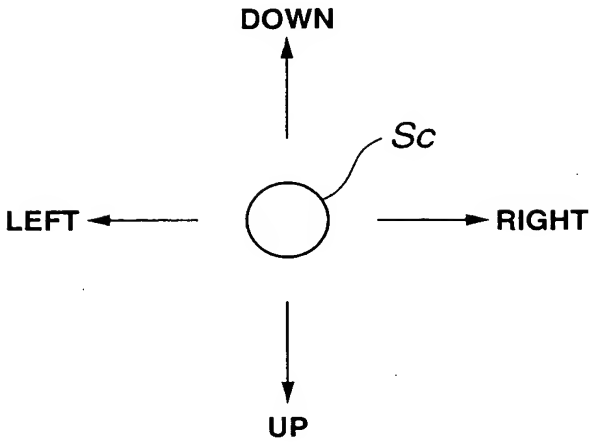

FIG.6A

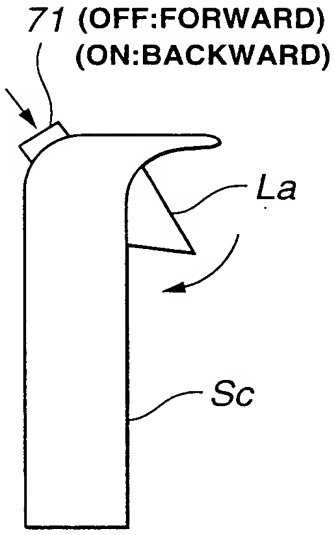

FIG.6C

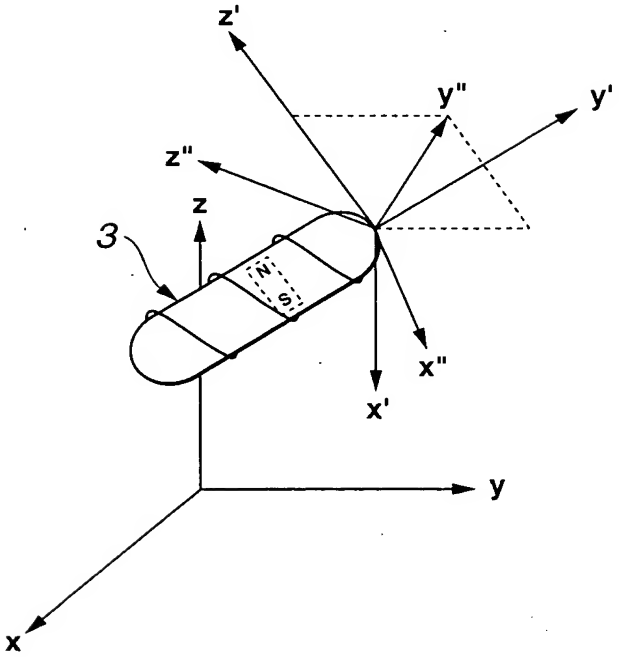

FIG.7A

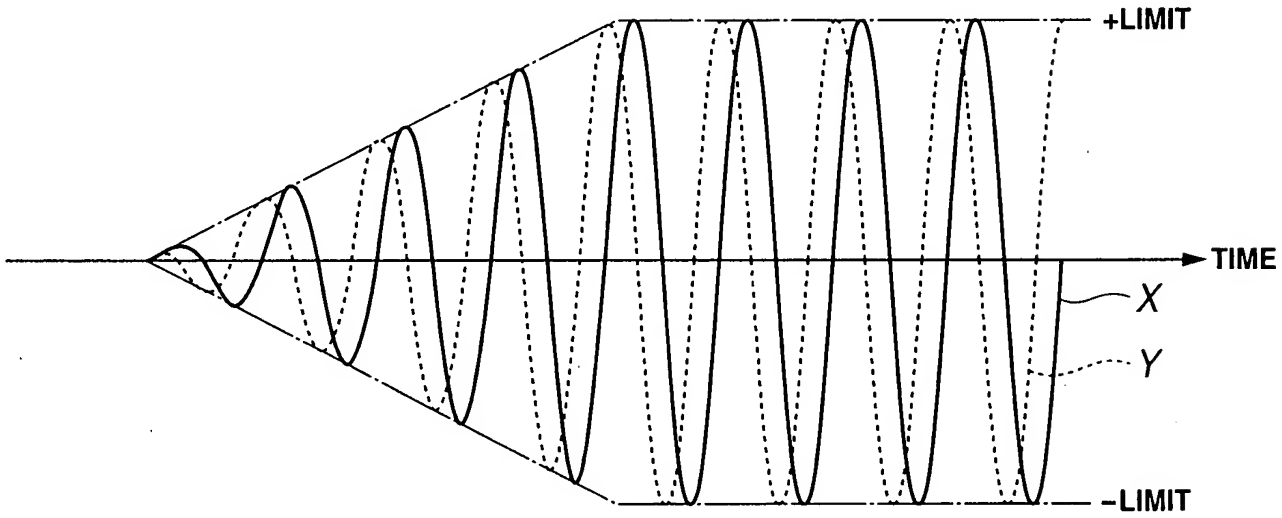

FIG.7B

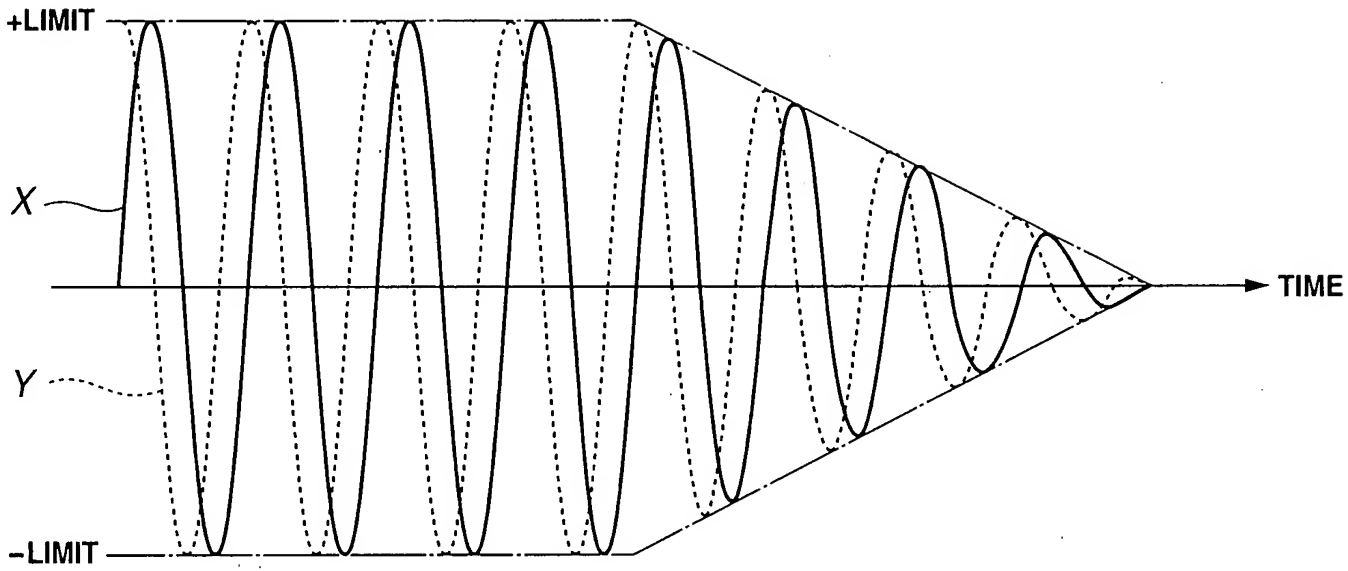

FIG.8

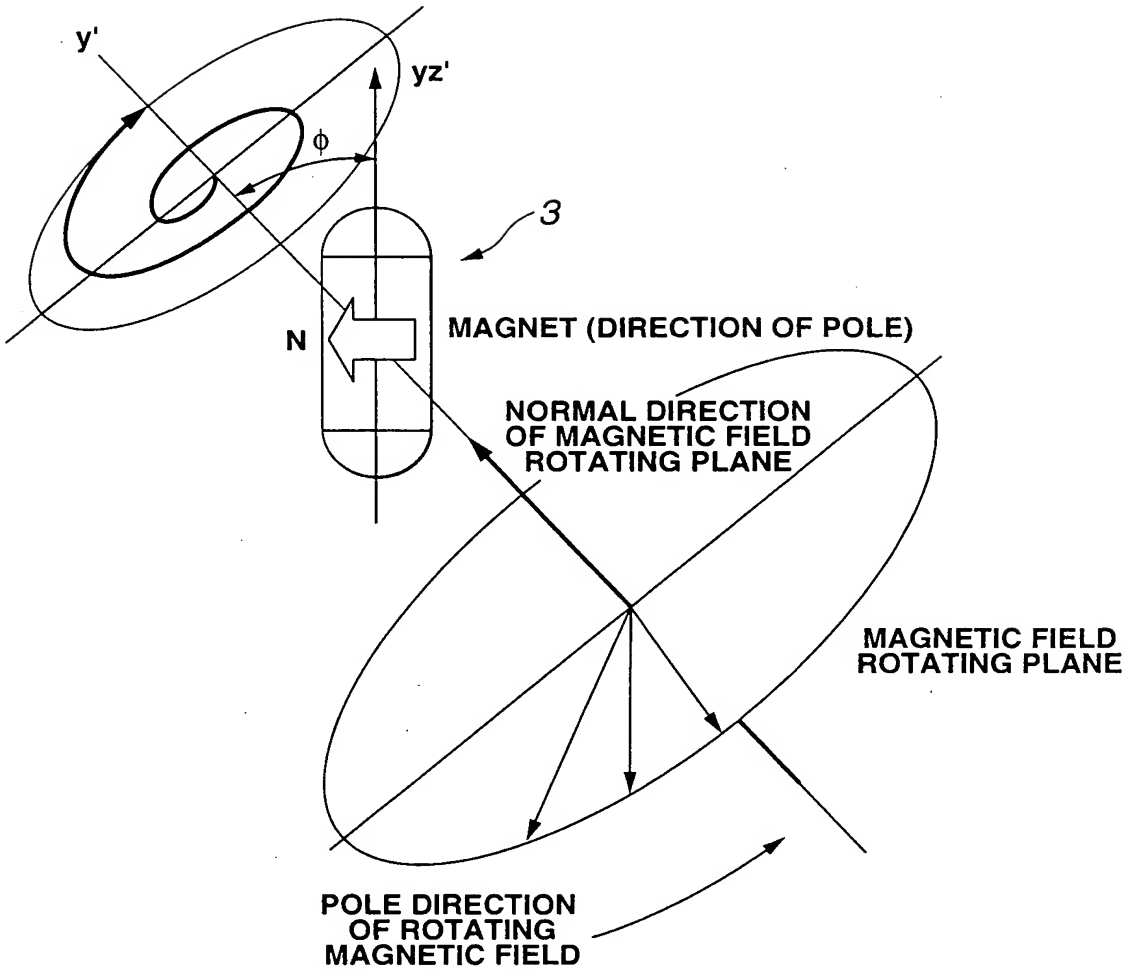
y'
yz'
ϕ
3
N
MAGNET (DIRECTION OF POLE)
NORMAL DIRECTION
OF MAGNETIC FIELD
ROTATING PLANE
MAGNETIC FIELD
ROTATING PLANE
POLE DIRECTION
OF ROTATING
MAGNETIC FIELD

FIG.9

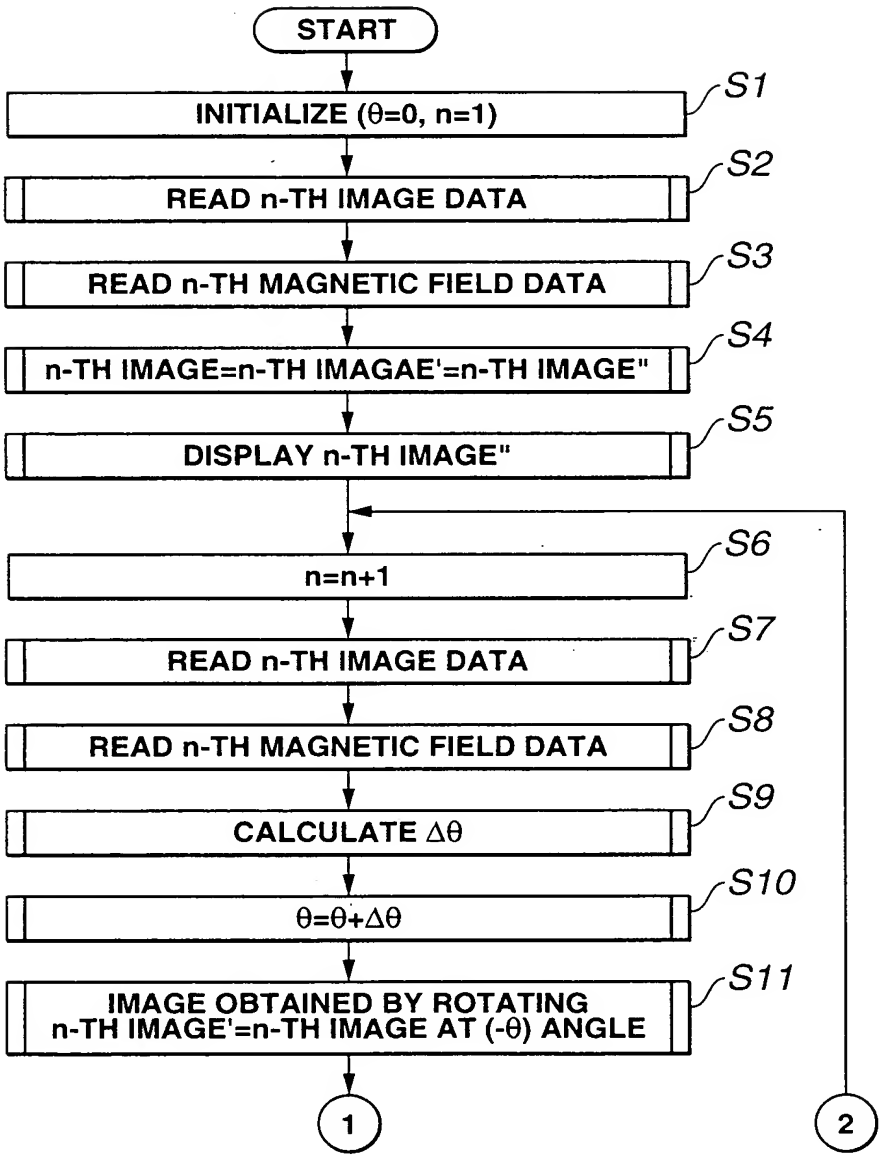
START
INITIALIZE (θ=0, n=1)
S1
READ n-TH IMAGE DATA
S2
READ n-TH MAGNETIC FIELD DATA
S3
n-TH IMAGE=n-TH IMAGAE'=n-TH IMAGE"
S4
DISPLAY n-TH IMAGE"
S5
n=n+1
S6
READ n-TH IMAGE DATA
S7
READ n-TH MAGNETIC FIELD DATA
S8
CALCULATE Δθ
S9
θ=θ+Δθ
S10
IMAGE OBTAINED BY ROTATING
n-TH IMAGE'=n-TH IMAGE AT (-θ) ANGLE
S11
1
2

FIG.10

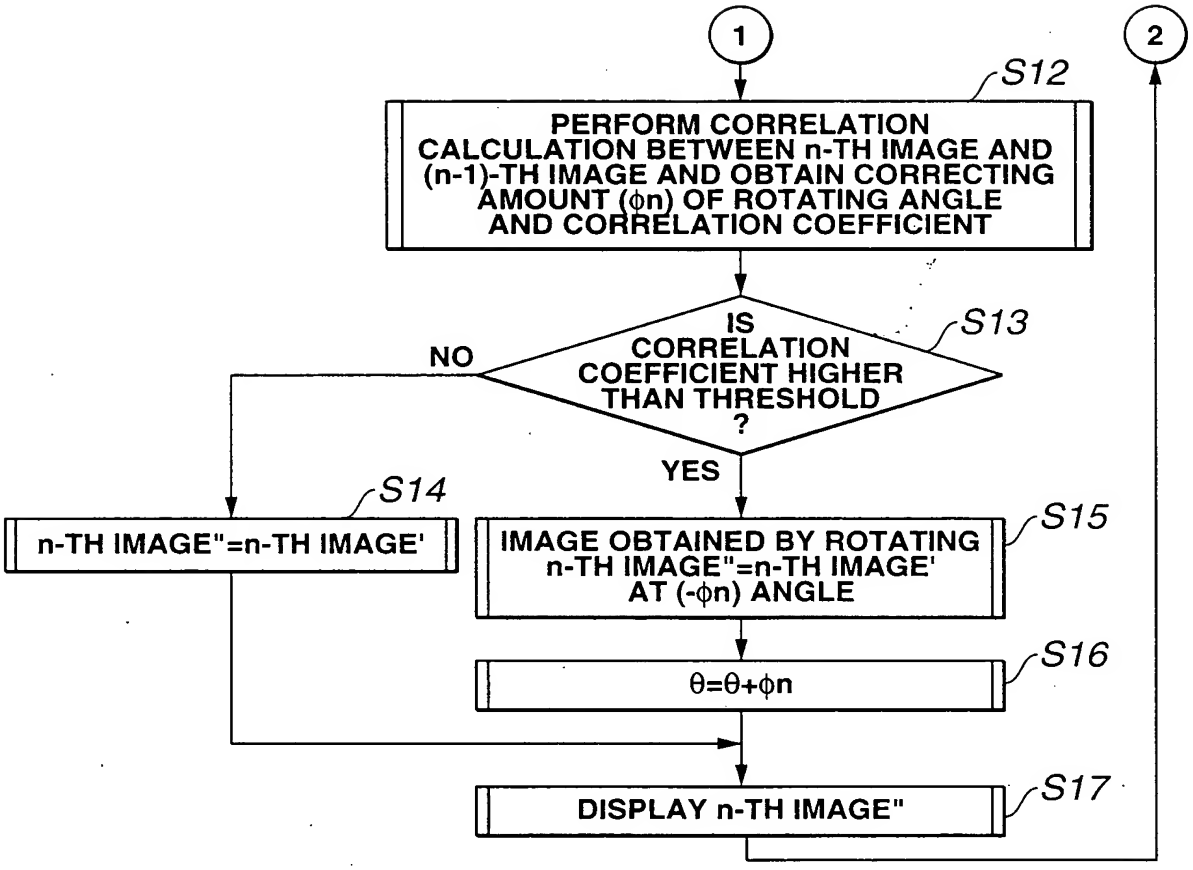
1
2
S12
PERFORM CORRELATION CALCULATION BETWEEN n-TH IMAGE AND (n-1)-TH IMAGE AND OBTAIN CORRECTING AMOUNT (φn) OF ROTATING ANGLE AND CORRELATION COEFFICIENT
S13
IS CORRELATION COEFFICIENT HIGHER THAN THRESHOLD ?
NO
YES
S14
n-TH IMAGE"=n-TH IMAGE'
S15
IMAGE OBTAINED BY ROTATING n-TH IMAGE"=n-TH IMAGE' AT (-φn) ANGLE
S16
θ=θ+φn
S17
DISPLAY n-TH IMAGE"

FIG.11

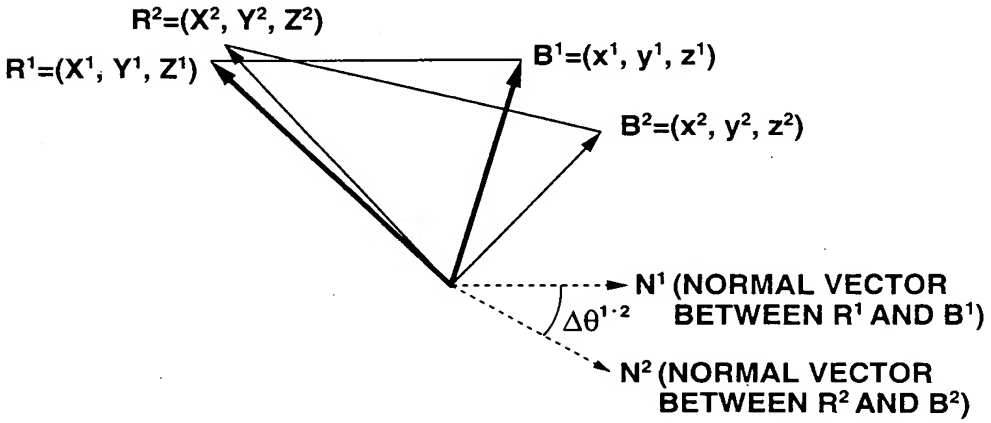
R²=(X², Y², Z²)
R¹=(X¹, Y¹, Z¹)
B¹=(x¹, y¹, z¹)
B²=(x², y², z²)
N¹ (NORMAL VECTOR BETWEEN R¹ AND B¹)
Δθ¹·²
N² (NORMAL VECTOR BETWEEN R² AND B²)

FIG.12

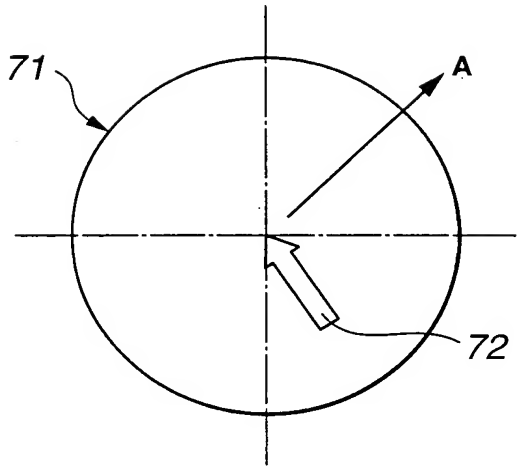
71
A
72

FIG.13

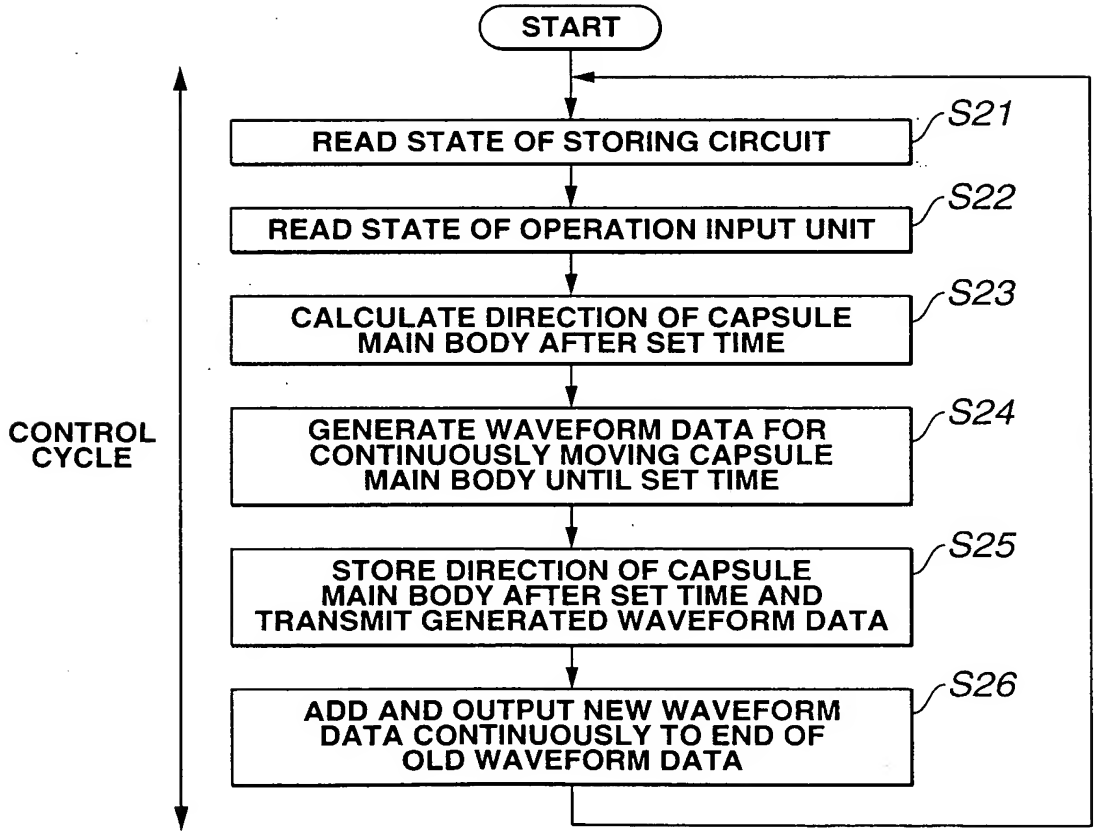
START
READ STATE OF STORING CIRCUIT
S21
READ STATE OF OPERATION INPUT UNIT
S22
CALCULATE DIRECTION OF CAPSULE MAIN BODY AFTER SET TIME
S23
GENERATE WAVEFORM DATA FOR CONTINUOUSLY MOVING CAPSULE MAIN BODY UNTIL SET TIME
S24
STORE DIRECTION OF CAPSULE MAIN BODY AFTER SET TIME AND TRANSMIT GENERATED WAVEFORM DATA
S25
ADD AND OUTPUT NEW WAVEFORM DATA CONTINUOUSLY TO END OF OLD WAVEFORM DATA
S26
CONTROL CYCLE

FIG.14

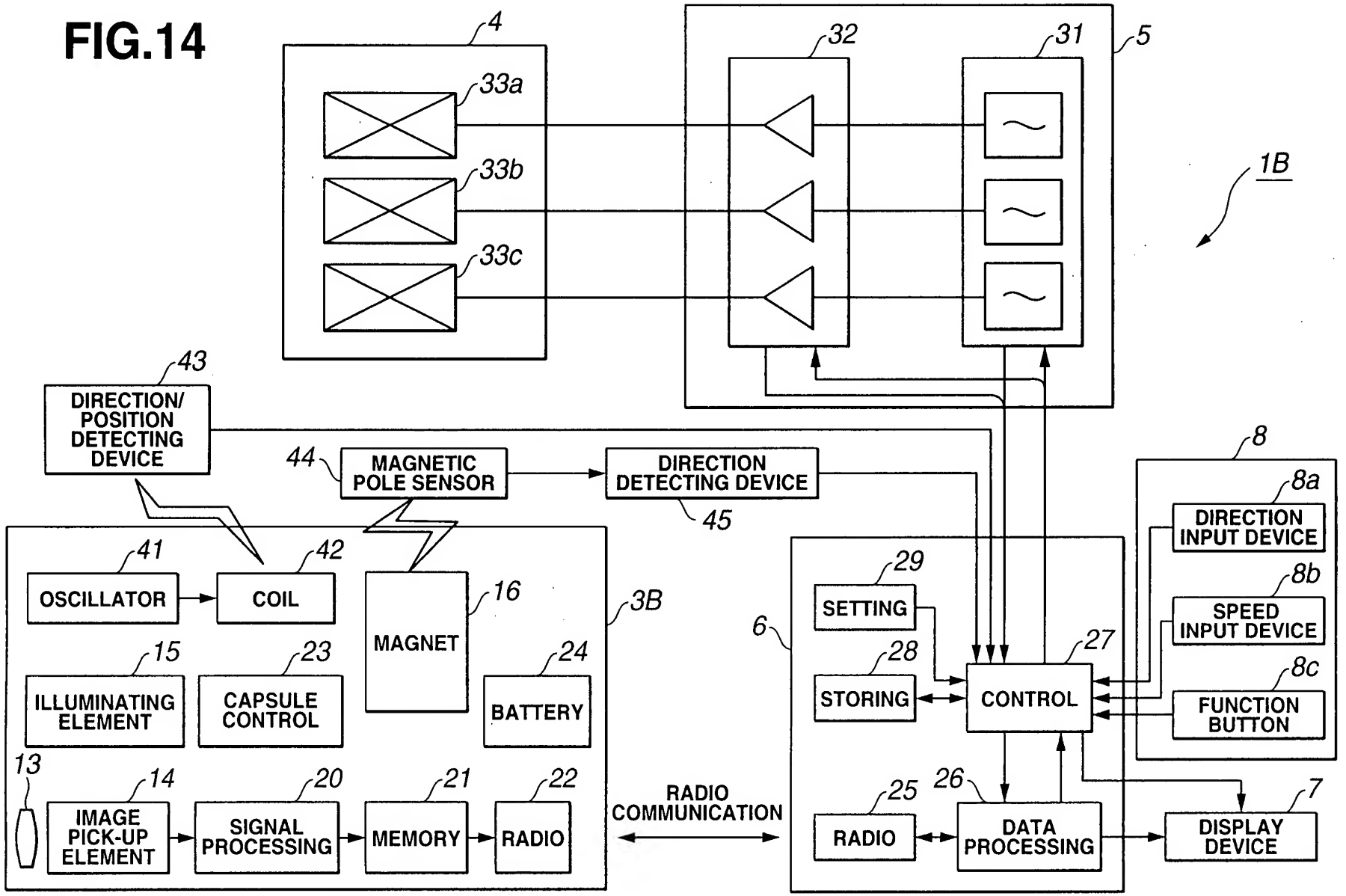
4
33a
33b
33c
32
31
5
1B
43
DIRECTION/ POSITION DETECTING DEVICE
44
MAGNETIC POLE SENSOR
DIRECTION DETECTING DEVICE
45
8
8a
DIRECTION INPUT DEVICE
8b
SPEED INPUT DEVICE
8c
FUNCTION BUTTON
41
OSCILLATOR
42
COIL
MAGNET
16
3B
15
ILLUMINATING ELEMENT
23
CAPSULE CONTROL
24
BATTERY
13
14
IMAGE PICK-UP ELEMENT
20
SIGNAL PROCESSING
21
MEMORY
22
RADIO
RADIO COMMUNICATION
6
29
SETTING
28
STORING
CONTROL
27
25
RADIO
26
DATA PROCESSING
7
DISPLAY DEVICE

FIG.15

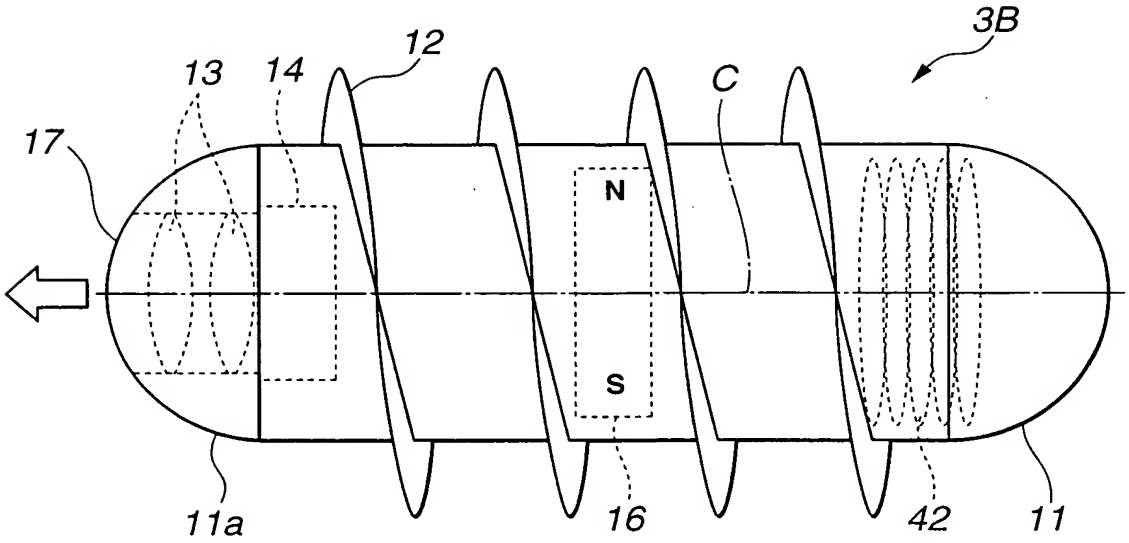

FIG.16

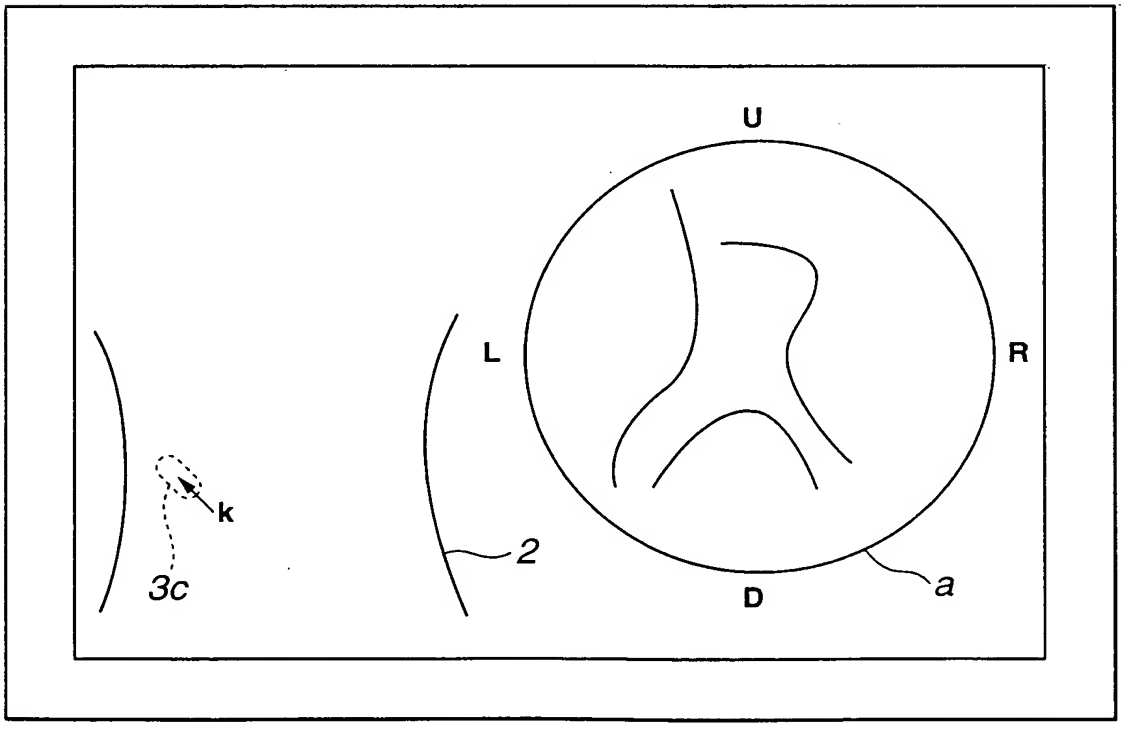

FIG.17

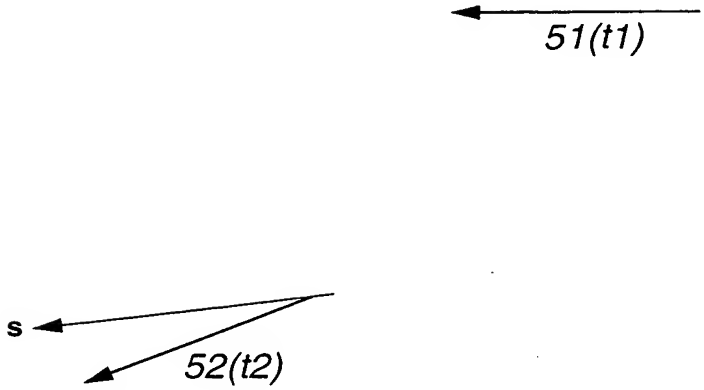

FIG.18A

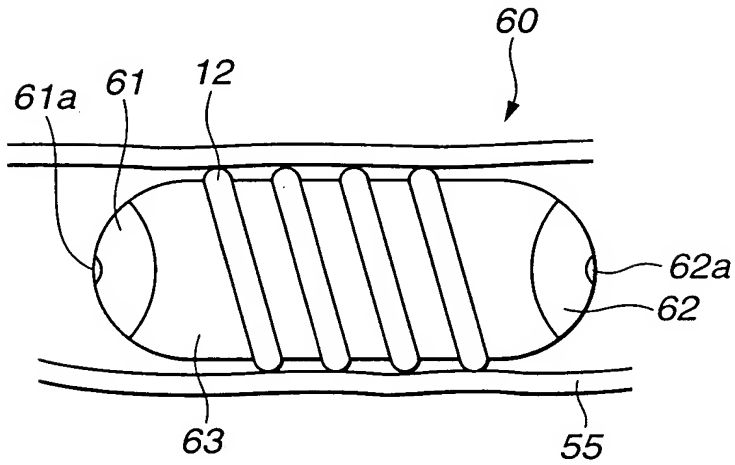
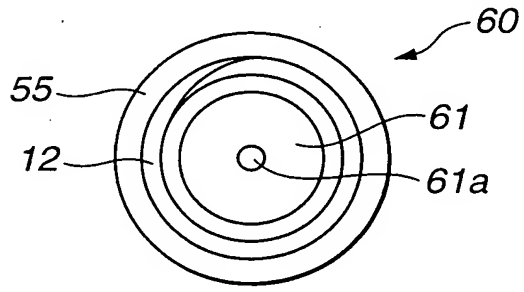
FIG.18B